PROJECT NUMBER: 1708
PROJECT TITLE: Physical Chemistry and Process Monitoring
PROJECT LEADER: J. L. Banyasz
PERIOD COVERED: May, 1990

I. NEW EXPANSION PROCESSES (J. Crump and S. Ganeriwala)

A. **Objective:** Evaluate and quantify the variables affecting the collapse of expanded tobacco.

B. **Results:** Stress relaxation and recovery tests were carried out with bright lamina to simulate expansion and collapse using the Dynastat. The lamina were conditioned to 75% RH (16% OV) and then stretched by 50-100% using the "zero span" technique. The strain was then maintained constant and the time dependence of the stress was monitored. The stress relaxation rates were found to be very rapid with the stress falling to 33% of its initial value within one second. The relaxation rate did not appear to be a strong function of the initial strain. Experiments were also conducted where the sample was initially stretched and then allowed to recover. The recovery rates were about 50% slower than the stress relaxation rates. The results indicate that tobacco would expand readily and collapse rapidly at 16% OV. Further experiments will be carried out as a function of OV and tobacco stiffness.

Experiments have been initiated to determine the feasibility of using the FTMA as a means of monitoring the collapse of expanded filler in real time.

Tower exit expanded tobacco was reordered to OV values ranging from 5 to 35%. Both the reordering rates and the final OV values varied during the process. The resulting SV values were found to decrease in an approximately sigmoidal fashion as the final OV increased. The steepest portion of the curve appears to be around 60% RH (11.5 to 12% OV). The results indicate the collapse is sensitive to both the reordering rate and the final OV value. Experiments are continuing to determine SV as a function of final OV at constant rates of reordering.

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II. PROJECT ART (NICOTINE STUDIES) (A. K. Basak)

A. Objective: Characterize the behavior of nicotine in aqueous solution.

B. Results: Titrations are in progress to determine the interactions between nicotine, citrate, and carbon dioxide in concentrated solutions.

III. MENTHOL STUDIES (T. V. Van Auken)

A. Objective: Determine the mechanism of menthol migration.

B. Results: Modifications to the tow mentholator have been completed. Testing will commence next week.

IV. OPERATIONS SUPPORT (D. M. Driscoll)

A. Objective: Develop and implement at plant levels, low energy and low capital cost technology to assure the required levels of dissolved oxygen (4.6 mg/L) in the effluent from the Park 500 waste-treatment plant.

B. Results: The oxygenation process using the sonic mixer has been scaled to 50 gpm level. The results suggest that efficiency increases with flow rate probably due to increased turbulence. Scale up will continue pending the arrival of a larger mixer.

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